T 2 Sampling of Aggregates

1. According to this FOP, which of the following statements is true?
   a. Field samples taken in-place from the roadway shall consist of multiple increments.
   b. If the portion obtained by sampling accurately represents the material being obtained, any analysis of that portion is inappropriate for the project at hand.
   c. Maximum size is one sieve larger than the first sieve to retain more than 10 percent based on cumulative percent retained.
   d. Sampling of stockpiles is always the preferred method because of the representative nature of such large quantities of material.
   e. None of the above.

2. When sampling from the conveyor belt, which method requires stopping the belt?
   a. Method A.
   b. Method B.
   c. Both Methods A & B.
   d. Neither Method A nor B.

3. When sampling from the belt discharge (Method B), pass the sampling device twice through the material perpendicular to the stream attempting to exactly fill it.
   a. True
   b. False

T 248 Reducing Field Samples of Aggregates to Testing Size

4. According to this FOP, which of the following statements is **incorrect**?
   a. Samples consisting of mixtures of coarse and fine aggregate may be reduced only by Method A (Mechanical Splitter).
   b. Samples of coarse aggregate wetter than SSD shall not be reduced by Method B (Quartering).
   c. Method A (mechanical splitter) is the preferred method for reducing any aggregate sample to testing size regardless of moisture content.
   d. When using Method B (Quartering) the mass of the two final sample quarters must agree within five percent.
   e. All of the above.

5. According to this FOP, which method should be used to reduce wet fine aggregate to testing size?
   a. Method A (Mechanical Splitter)
   b. Method B (Quartering)
   c. Method C (Small Stockpile)
   d. b & c
   e. All of the above.

6. When quartering per Method B turn the material over at least four times either with a shovel or by rolling the sample by pulling a corner of the blanket diagonally across the sample. After turning and forming into a conical pile, flatten the pile such that the height is four to eight times the diameter.
   a. True
   b. False

T 168 Sampling Bituminous Paving Mixtures

7. Which of the following containers may be used for samples of open-graded Hot Mix Asphalt?
   a. Stainless steel bowls.
   b. Cardboard boxes.
   c. Wide-mouth plastic container with screw cap; protect sample from freezing.
   d. a & b
   e. All of the above.

8. Which of the following statements is **incorrect**?
   a. When using an attached sampling device to obtain samples of HMA, one must pass the container twice through the material perpendicularly without overfilling.
   b. Samples of dense-graded mixtures may be placed in cardboard boxes or other agency approved containers.
   c. When sampling from the roadway prior to compaction using the plate method, it is always required to use the plate and cookie cutter sampling device.
   d. a & b
   e. None of the above.

9. Which of the following statements is true?
   a. HMA sample size depends on the test methods specified by the agency for acceptance. The agency requirement therefore governs required sample size.
   b. Samples used for acceptance tests must be selected at random. Samples may be obtained by the purchaser or authorized representative.
   c. When using mechanical sampling devices that are manually operated, no special caution is required regarding consistent speed in passing the device through the material.
   d. a & b
   e. All of the above.

T 328 Reducing Samples of HMA to Testing Size

10. According to this FOP, use of Method A (Mechanical Splitter) or Method C (Riffle Splitter) is preferred…
    a. when reducing samples to a size appropriate for individual test procedures.
    b. because it allows rapid sample reduction while the sample is still warm enough to separate readily.
    c. Never.
    d. a & b
    e. None of the above.

11. When reducing HMA samples to testing size by Method A (Mechanical Splitter)…
    a. HMA from opposite receptacles must be combined either to form the sample, or for further reduction to testing size.
    b. surfaces that will be in contact with HMA must be heated to a temperature not exceeding 230ºF prior to use.
    c. use of the agency-approved release agent is not required.
    d. a & b
    e. None of the above.

12. Which of the following **does not** describe the Quartering Template used for the Method B procedure at time of use?
    a. The template is manufactured of metal that will withstand heat and use without deforming.
    b. The template is formed in the shape of a cross having equal length sides at right angles to each other. Length and height of sides must exceed the diameter and thickness of the flattened cone of HMA.
    c. The template is heated prior to use and may receive a light coating of approved release agent.
    d. None of the above.

13. With the exception of miscellaneous tools such as trowels, spatulas, taping knives, etc., the apparatus for which method(s) **is not** heated prior to use?
    a. Method A
    b. Method B
    c. Method C
    d. a & b
    e. None of the above. All reduction apparatus must be heated.

T40 Sampling Bituminous Materials

14. According to this FOP, which kind(s) of material must be protected from freezing?
    a. Only material sampled when in the solid or semi-solid state.
    b. Performance Graded (PG) Binders sampled from the HMA plant, because freezing may cause changes that alter the binder grade.
    c. Cutbacks and HMA binders.
    d. Emulsions and cutbacks.
    e. None of the above.

15. What special precaution(s) must be taken when sampling emulsified asphalt?
    a. Emulsions must be sampled prior to dilution unless the material is obtained directly from the spray bar, in which case the binder is considered to be representative of that used on the roadway.
    b. No special precautions are required other than those concerning cleanliness of the container.
    c. Emulsions may only be sampled from the delivery truck to avoid contamination that occurs when pumping into the distributor.
    d. The sample container must be completely filled to avoid formation of a skin on the sample.
    e. None of the above.

T 310 IN-PLACE DENSITY AND MOISTURE CONTENT OF SOIL AND SOIL-AGGREGATE NUCLEAR METHODS (Shallow Depth)

16. Describe the difference(s) between gauge calibration and standardization.

17. For gauge readings to be valid for the determination of dry density, gauge moisture must agree with that determined by the FOP for either AASHTO T 255 / T 265 or AASHTO T 217 within ± 1%.

    a. True
    b. False

Calculations

18. Calculation of dry density using Method A (Single Direction).

$$P_d = \left(\frac{P_w}{w + 100} \right) \times 100 \qquad \text{or} \qquad P_d = \left(\frac{P_w}{\frac{w}{100} + 1} \right)$$

Known:

	Wet Density	Moisture Content
First one-minute gauge reading	144.7 lb/ft^3	7.4%
Second one-minute gauge reading	142.5 lb/ft^3	7.8%
Laboratory moisture content		8.5%

Given the information presented above, what is the dry density for this test location? Is the test valid according to the rules established by this FOP (Yes/No)? If not valid, why?

_____

_____

TM 8 IN-PLACE DENSITY OF HOT MIX ASPHALT USING THE NUCLEAR MOISTURE-DENSITY GAUGE

19. According to this FOP, which of the following statements regarding standardization is **incorrect**?

    a. Turn the gauge on and allow it to stabilize for approximately 10 to 20 minutes.
    b. Perform the standardization at the construction site at the beginning of each day's work and whenever deemed necessary by the operator or agency.
    c. Perform the standard count procedure according to the manufacturer's operator's manual and record the standard counts in the Daily Standard Count Log.
    d. Calibration may be performed by the agency using the manufacturer's recommended procedures or by other facilities approved by the agency. Frequency should be every 12 months.
    e. None of the above.

20. According to this FOP, when must the gauge manufacturer's correction procedure be used?
    a. When the gauge will be used for density determinations within 6-inches of a vertical projection.
    b. When the gauge will be used for density determinations in a mode not requiring the use of filler material.
    c. When the gauge will be closer than 24 in. to any vertical mass.
    d. When the gauge will be within 10 feet of a large object, or the depth of the HMA is less than 0.11 ft.
    e. All of the above.

21. At the beginning of each day or shift, the technician is required to calibrate the gauge at the jobsite.
    a. True
    b. False

22. Percent Compaction Calculation (Direct Transmission Method):

$$\%\text{Compaction} = \left[\frac{\text{Corrected Reading}}{\text{Maximum Density}}\right] \times 100$$

Known

Maximum Density (G_{mm})	=	151.5 lb/ft^3
Density Reading #1	=	143.0 lb/ft^3
Density Reading #2	=	146.2 lb/ft^3
Core Correction	=	– 2.3 lb/ft^3

Given the information provided, the percent compaction is _____. Is the test valid? (Yes/No)

a. 94 - - Yes
b. 97.2 - - No
c. 95.6 - - Yes
d. 93.9 - - No
e. None of the above.

If the test is not valid, why is this the case?

_____

_____

23. Percent Compaction Calculation (Backscatter Method):

$$\%\text{Compaction} = \left[\frac{\text{Corrected Reading}}{\text{Maximum Density}}\right] \times 100$$

Known

Maximum Density (G_{mm})	=	153.6 lb/ft^3
Density Reading #1	=	145.6 lb/ft^3
Density Reading #2	=	147.2 lb/ft^3
Core Correction	=	3.4 lb/ft^3

Given the information provided, the percent compaction is _____. Is the test valid? (Yes/No)

a. 95.3 - - Yes
b. 97.5 - - No
c. 93.1 - - Yes
d. 94.9 - - No
e. None of the above.

If the test is not valid, why is this the case?

_____

_____